

2-2023

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Yuanhui Zhao
Beijing Sport University

Wenxing Wang
Beijing Sport University

Fang Gao
Beijing Sport University

Bowen Cui
Beijing Sport University

Chun Hu
Beijing Sport University

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Recommended Citation

Zhao, Yuanhui; Wang, Wenxing; Gao, Fang; Cui, Bowen; Hu, Chun; Yu, Wenlang; Wang, Mengdie; and Ren, Hong (2023) "Effects of Personalized Aerobic-Exercise and Resistance-Training Prescriptions on College Students with Anxiety During the COVID-19," *International Journal of Physical Activity and Health*: Vol. 2: Iss. 1, Article 3.

DOI: <https://doi.org/10.18122/ijpah.020103.boisestate>

Available at: <https://scholarworks.boisestate.edu/ijpah/vol2/iss1/3>

Effects of Personalized Aerobic-Exercise and Resistance-Training Prescriptions on College Students with Anxiety During the COVID-19

Abstract

The COVID-19 pandemic has seriously increased anxiety prevalence among the public, including Chinese college students. However, many exercises cannot be performed as usual under the stay-at-home order. The purpose of this study was to evaluate and compare the effect of personalized individual aerobic-exercise and resistance-training prescriptions on anxiety in college students during the COVID-19. This was a 12-week three-arm randomized control trial using the intention-to-treat principle. Sixty-six college students with anxiety were recruited and randomized into aerobic-exercise (AE), resistance-training (RT), and health-education group (HE). AE and RT groups also received health education. Measures on anxiety and physical activity included Zung Self-Rating Anxiety Scale (SAS), Chinese College Students Mental Health Scale - Anxiety Subscale (CCSMHS-AS) and International Physical Activity Questionnaire-Short Form (IPAQ-SF). All data were collected at the baseline, 4, 8, 12 weeks and 4-week post-intervention. All participants completed the intervention and measurements. The mean (SD) of SAS, CCSMHS-AS score and physical activity was 56.36 (5.63), 19.27 (4.56), 1306.57 (1421.19) (met-min/week). After the intervention, 78.79% of anxiety participants improved from anxiety to "normal". Participants in all groups showed a statistically and clinically significant improvement after 12-week intervention ($p < 0.001$). Moreover, such improvement was well-maintained in RT and HE group as there were no significant differences in SAS and CCSMHS-AS at 4-week post-intervention compared to 12 weeks ($p > 0.05$). However, the SAS score of participants in AE group showed a significant increase during the 4 weeks after intervention ($p < 0.05$). No significant differences were observed in the effect of AE and RT on anxiety at each time-point ($p > 0.05$). PA of participants in AE and RT group represented a significant improvement at 4-week post-intervention compared to baseline ($p < 0.01$). Personalized individual aerobic-exercise and resistance-training combined with health-education resulted in a similar effect on reducing anxiety and improving physical activity, and the effect was better than health education alone. Furthermore, the effect of resistance-training and health-education on reducing anxiety was more stable than that of aerobic-exercise. We recommended 45- to 60-minute home-based individual exercise (including 30- to 40-minute main exercise) with progressive moderate-to-high intensity, 3 times/week for at least 12 weeks for those students with anxiety during the COVID-19 pandemic.

Authors

Yuanhui Zhao, Wenxing Wang, Fang Gao, Bowen Cui, Chun Hu, Wenlang Yu, Mengdie Wang, and Hong Ren

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^aYuanhui Zhao, ^aWenxing Wang, ^aFang Gao, ^aBowen Cui, ^aChun Hu, ^aWenlang Yu, ^bMengdie Wang, and ^aHong Ren

^aSchool of Sport Science, Beijing Sport University, ^bChina Institute of Sport Science, Beijing

Abstract

The COVID-19 pandemic has seriously increased anxiety prevalence among the public, including Chinese college students. However, many exercises cannot be performed as usual under the stay-at-home order. The purpose of this study was to evaluate and compare the effect of personalized individual aerobic-exercise and resistance-training prescriptions on anxiety in college students during the COVID-19. This was a 12-week three-arm randomized control trial using the intention-to-treat principle. Sixty-six college students with anxiety were recruited and randomized into aerobic-exercise (AE), resistance-training (RT), and health-education group (HE). AE and RT groups also received health education. Measures on anxiety and physical activity included Zung Self-Rating Anxiety Scale (SAS), Chinese College Students Mental Health Scale - Anxiety Subscale (CCSMHS-AS) and International Physical Activity Questionnaire-Short Form (IPAQ-SF). All data were collected at the baseline, 4, 8, 12 weeks and 4-week post-intervention. All participants completed the intervention and measurements. The mean (SD) of SAS, CCSMHS-AS score and physical activity was 56.36 (5.63), 19.27 (4.56), 1306.57 (1421.19) (met-min/week). After the intervention, 78.79% of anxiety participants improved from anxiety to “normal”. Participants in all groups showed a statistically and clinically significant improvement after 12-week intervention ($p < 0.001$). Moreover, such improvement was well-maintained in RT and HE group as there were no significant differences in SAS and CCSMHS-AS at 4-week post-intervention compared to 12 weeks ($p > 0.05$). However, the SAS score of participants in AE group showed a significant increase during the 4 weeks after intervention ($p < 0.05$). No significant differences were observed in the effect of AE and RT on anxiety at each time-point ($p > 0.05$). PA of participants in AE and RT group represented a significant improvement at 4-week post-intervention compared to baseline ($p < 0.01$). Personalized individual aerobic-exercise and resistance-training combined with health-education resulted in a similar effect on reducing anxiety and improving physical activity, and the effect was better than health education alone. Furthermore, the effect of resistance-training and health-education on reducing anxiety was more stable than that of aerobic-exercise. We recommended 45- to 60-minute home-based individual exercise (including 30- to 40-minute main exercise) with progressive moderate-to-high intensity, 3 times/week for at least 12 weeks for those students with anxiety during the COVID-19 pandemic.

Keywords: personalized exercise prescription, aerobic exercise, resistance training, anxiety, college student, COVID-19